

Sub-earth Ducts.

The Wisconsin Experiment Station has for years been conducting experiments in cooling cheese curing rooms by means of air ducts run under the ground at a sufficient depth to cool the air in passing. The ground, at a dis-

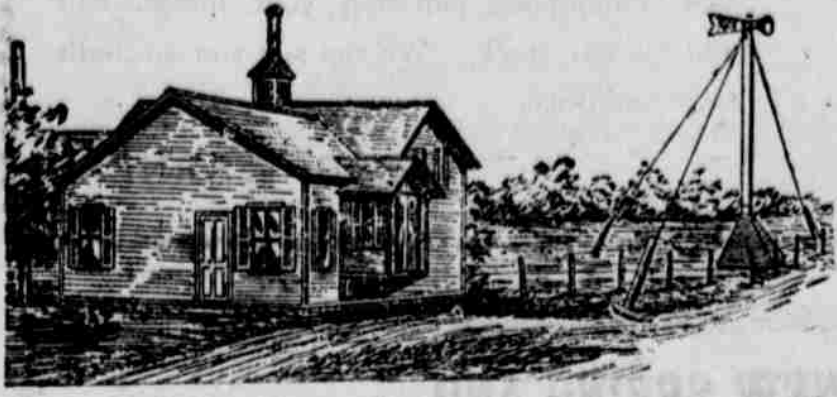


Fig. 1—Cheese factory with funnel of sub-earth duct.

tance of 20 to 80 feet below the surface, keeps the same temperature the year round, and this temperature is about four degrees higher than the average temperature for the year in that place. Thus, in the northern part of Wisconsin the mean temperature for the year

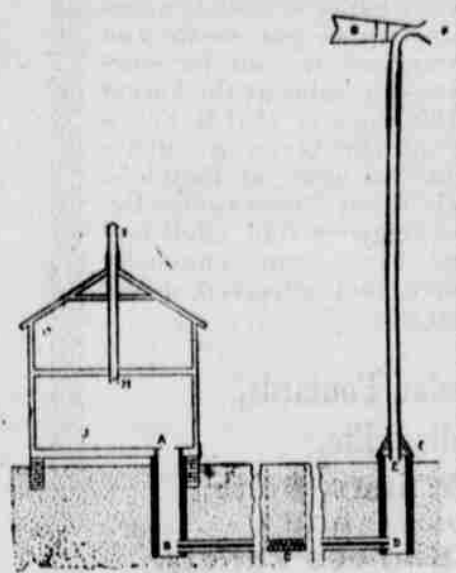


Fig. 2—Horizontal sub-earth duct.

is about 40 degrees; and the temperature of the soil water, below where it is affected by the light of the sun is about 44 or 45 degrees. This temperature is so low that the utilization of this cold may be made of great value. Even in the southern part of the state the soil temperature at the depth mentioned is about 52 degrees. Above 20 feet the ground grows gradually warmer on account of the heat of the sun; below 80 feet the ground generally grows warmer on account of the heat from the center of the earth. This layer of earth where the temperature is the same the year round is called the zone of thermal equilibrium. But above 20 feet, to within 6 feet of the surface of the ground, the soil is only 4 or 5 degrees warmer than the soil in the thermal equilibrium zone.

The utilizing of the above cited facts

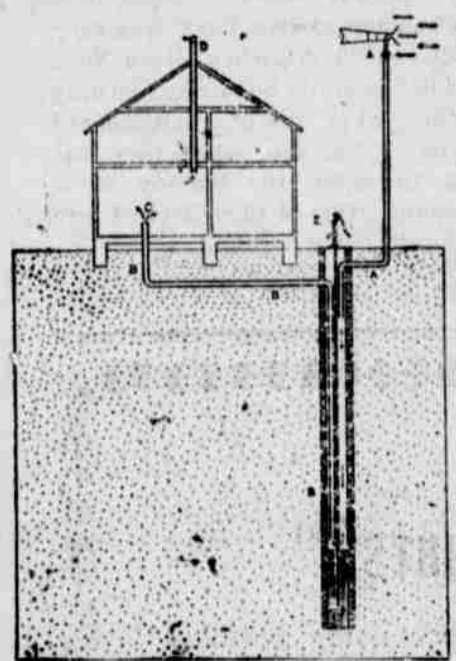


Fig. 3—Vertical sub-earth duct.

has made it possible for cheese curing rooms to be constructed in which the temperature is kept at a low point even in the hottest weather. In Figure 1 we show the cheese factory owned by P. H. Kasper. There is a sub-earth duct 100 feet long and which is placed about ten feet below the surface of the ground. At the other end of the duct is the upright funnel surmounted by a hood, at which point the air enters. In Figure 2 is shown a section of a cheese curing room and horizontal multiple sub-earth duct. A is the inlet to the curing room; B, end of sub-earth duct in bricked entrance to factory; C, cross-section of the multiple ducts as placed; D, E, bricked entrance under funnel at outer end of sub-earth duct; F, funnel with mouth 36 inches across; G, Vane to hold funnel to wind.

In Figure 3 is shown a method of

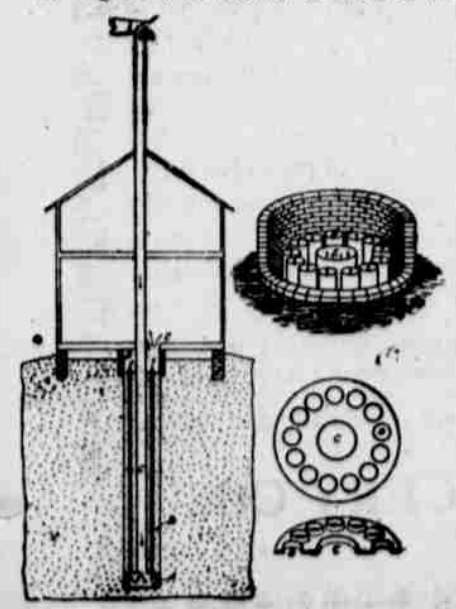


Fig. 4—Duct under factory.

cooling the air by running it into a deep hole in the ground. The pump is for the purpose of keeping this dry well from filling with water. This saves digging a long trench in the ground, but it is doubtful if it is as effective. The well here illustrated is 64 feet deep, and the funnel runs a little way above the roof of the factory. A ten-inch pipe starts at the bottom of the well and rises to within five or

25 feet of the surface of the ground, and then is turned off horizontally and rises up into the curing room. Figure 4 shows a vertical sub-earth duct. A is a brick chamber 25 to 30 feet below the surface and 40 inches inside diameter; B, tile or conductor pipe of galvanized iron; C, main shaft of funnel; D, brick chamber at upper end of duct. The duct that brings the air down is represented in the drawing as coming from above the roof of the factory, the air going down through the center and going up through the sides. These ducts, of course, are in contact with the cold ground all around, and so are in the best possible condition for being cooled by the ground. Of this duct, Professor King says, "I have little hesitation in saying that these ducts, 25 to 30 feet long, would give just as good satisfaction as a horizontal duct 12 feet deep and 100 feet long. You have less dirt to move in digging it. You can bring the duct close to the factory or place it under it. I think the best place would be under the curing room. This arrangement permits the factory to be used as a part of the support or stay for your ventilating stack.

Figure 5 shows the method of cooling air with cold water. A is the curing room; B, duct leading into curing room; C, E, galvanized iron drums, air and water tight; F, 13 or more 5-inch flues of galvanized iron 10 feet long soldered water-tight to drums to cool air; D, main air duct from funnel; G, water pipe from pump; H, over-flow pipe; I, damper in main shaft; J, 4-inch pipe leading from blower to use when there is no wind; K, smoke-stack of boiler; L, ventilator from curing room; G, smoke-stack; N, boiler.

Figure 6 shows the funnel and vane and illustrates the manner of mounting. A, funnel; B, shaft of funnel; C, C, C, one-inch gas pipe; F, G, H, and M M and N N are stays of band iron bolted together and to the sides of the shaft to support the axis of the funnel; J, weather collar to turn rain out of shaft; K, L, band-iron to stiffen vane and attach it to the funnel. The object of this funnel is to force the air into the shaft and down into the duct. The vane keeps the mouth of the funnel always toward the wind.

The application of this principle to the cooling of rooms for curing cheese is of great value, but the time is com-

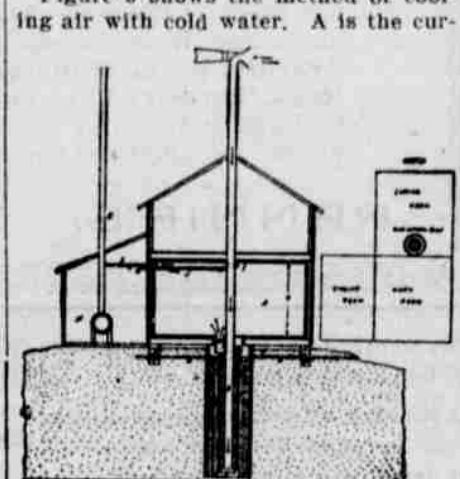


Fig. 5—Air cooled by water.

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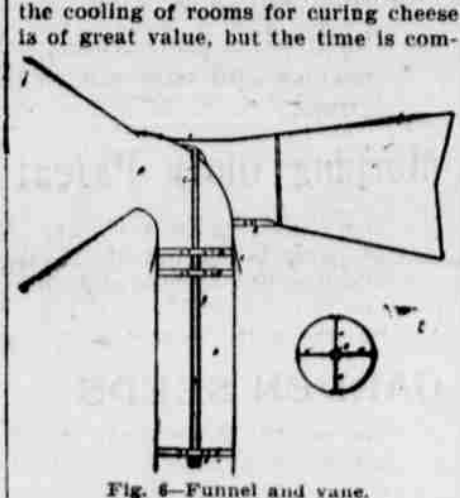


Fig. 6—Funnel and vane.

ing when the sub-earth duct will be used for cooling rooms where all kinds of products are stored, and even for the cooling of residences in summer.

Lexington Rolls
Are very simple, but the results are very good, says Rural New Yorker. Wash, pare and boil in salted water two good-sized Irish potatoes at lunch time. While hot drain, mash and add two tablespoonsfuls of butter, and when cold add one-half cake of yeast, two tablespoonsfuls of sugar, two cupsfuls of flour and make batter—about 1 1/2 cupsful. By night this should be as light as foam. Add more flour to make as thick a batter as possible—about a quart of flour to two cups of liquid—which beat with a big wooden spoon five minutes or more. Remove spoon and sprinkle the batter lightly with flour. In the morning beat the batter again, stiffen slightly with flour to make out into small rolls, spread tops with melted butter, let rise and bake in hot oven.

A Ward of the State.

He was an unattractive boy, undersized and lean, with a sulky mouth and a heavy frown between his eyes. He was trudging home from school, walking with his head bent, shoulders stooped, and a general vagabondish look about him.

When he went into the house where he lived, a little girl came running to meet him. His face lighted up when he saw her, and he thrust his hand into his pocket and brought up something that looked like a bunch of dried leaves.

"See what fell off the elm tree," he said. "It's a cocoon, and we'll keep it till spring and see what kind of a butterfly comes out of it." He put it back in his pocket after he had looked at it. The child's mother sat sewing at a window. She was a pleasant-faced woman and had listened to the boy with a smile. Now she spoke.

"Won't you bring in the wood, Jehosaphat?" she said, in a kindly voice. "You forgot it this morning, and I have had to bring some in myself."

The boy gave some inarticulate reply and slouched out of the room.

At the tea-table the little girl's father spoke pleasantly to the boy, telling him some piece of the farm news, but the boy was unresponsive. Only once he spoke, coloring, and hanging his head lower than usual. "Can—do people ever change their names?"

Why, yes, they told him; they knew of people who had done so.

After that the boy relapsed into moody silence.

It was a week or two later that there was a commotion in the school-house yard during the afternoon recess. A young woman was seen going into the schoolhouse. The children stopped their play and stared after her. "It is the State Lady," they whispered to each other. A number of them looked more excited and important than the rest; they were wards of the state, who were boarded at different farmhouses in the district.

The "State Lady" was the visiting inspector, who came around occasionally to see how her charges fared. She stayed through the last session of school, listening to the children's recitations. Then they were dismissed and went trooping home.

As the state visitor left the schoolhouse a small figure came from the shadow of the doorway and ran up to her. "May I speak to you, Miss Chamberlain?"

She turned and looked at him. "Why, certainly," she said. "This is Jehosaphat, isn't it?" she added, kindly.

"Yes'm."

She smiled down upon him, wondering what was coming. He had been one of her puzzling cases and she hardly knew what to make of him. He was very evidently discontented, but try as she might, she never could find out the cause of it. She would ask him if Mr. and Mrs. Bryant were not kind to him, and he would answer, "Yes'm," in his soft drawl. Did he have to work too hard? "No, m'm." Did he have enough to eat? "Yes'm." Was he ever punished unjustly? "No, m'm."

She questioned Mr. and Mrs. Bryant. He was a good boy, they maintained. He didn't seem very happy, but they didn't know what the reason was. He never talked much, but he was always good to little Ada; they always felt safe about her if he was with her.

His teacher said that he might easily be the best scholar in school if only he took any interest in his studies; as it was, he was the best reader she had.

Altogether, he was something of a problem, and Miss Chamberlain waited expectantly to hear what he had to say.

But Jehosaphat seemed to find it hard to begin. He walked slowly along by her side as if of half a mind to run away.

Finally, with desperate courage, he looked up into her brown eyes. "Some folks sometimes change their names," he blurted out.

Miss Chamberlain looked surprised. "Well?" she said.

He was looking down on the ground again. "I—I wish you'd get mine changed for me," he said, in a low, pleading voice.

"But, my dear boy—" she began.

He interrupted her, speaking quickly at last. "You don't know what I've gone through, all on account of my name. Ever since I can remember, everybody's laughed at me about it, and the boys at school call me everything they can think of—Joss Slicks, Old Hoss, Fatty, and—and everything, and I can't think of half of 'em now, and—and sometimes it don't seem as though I could stand it. How'd you like to be named Jehosaphat Plunkett? I—I want you to change it."

She put out her plump white hand and laid it gently on his shoulder. "My dear little boy," she said, "you don't know what you are asking. Suppose the state should change your name, as you wish. There are ever and ever so many other boys and girls under its care, and suppose they should hear about you and should all want to have their names changed. The state boards and clothes you, and you can't expect it to do more than that. No, I am sorry, but if you want your name changed you will have to wait till you are older and can earn the money for it yourself."

Her heart smote her as she saw the boy's disappointment. "Come," she said, "let us sit down on the rock. Now that we are having a talk together, there are some other things I want to say to you."

"I don't blame you a bit for wanting your name changed. I know it must be hard to bear. But every one has hard things to bear, and I want you to be brave and bear yours like a man. I want you to forget about your name all you can, and the best way to do that is to be busy. You are almost old enough to work for your own board, and it would be a good idea for you to get ready for that. You help Mr. and Mrs. Bryant, don't you?"

"I bring in the wood."

"Yes; and what else?"

"Nothing, except look after Ada a little."

Miss Chamberlain raised her eyebrows.

"Is that all they require of you?"

"Yes'm."

"No wonder you are unhappy. You must begin right away to do more. A great many of my boys, your age, help ever so much about the farm—milk, pull weeds, and other things. I never suspected that you had nothing to do but bring in wood. Mrs. Bryant said you worked. Now, you don't want to be a lazy boy. If you change your name and get a nice one, you want to be as good as your name, don't you? I thought so. And you will keep your eyes wide open after this, and see every chance there is to help Mr. and Mrs. Bryant, who have been so kind to you. You must work at school, too. Your teacher tells me that you might be a good scholar if you would only try."

She drew out her watch and looked at it. "I must go now," she said, rising. She held out her hand to him. "I shall expect to see a great improvement in you the next time I come around. You must make me proud of you." He looked up at her with sorrowful eyes, and she bent and kissed him before she turned and went down the road alone.

He stood watching her, and when she reached the corner and looked back and waved her hand, he waved his in return. Then he walked slowly home.

He was bitterly disappointed. He had hoped that the state lady would agree at once to his proposal, that he would tell her the name he had chosen, and that she would attend to the details, if there were any. He had spent much time deciding on a name, and had finally selected Reginald Ferdinand St. Clair as just to his taste. It had not occurred to him that the process of changing his name involved any expense. He saw the justice of everything Miss Chamberlain had said, and as he went home he made up his mind that he would follow her suggestion and earn the money with which to change his name.

In the days that followed, Miss Chamberlain's little speech was constantly in his thoughts. He set about devising means of earning money. He knew it would not be right to earn it of Mr. Bryant, for very soon he would have to do work enough to pay for his board. He must find things to do for the other neighbors. And here came a difficulty; he did not know how to do any kind of work. The Bryants had thought him rather delicate, and had, with intended kindness, let him spend his time almost as he liked.

When Jehosaphat recognized this first difficulty he was almost discouraged, but he thought of Reginald Ferdinand St. Clair, set his teeth, and went and asked Mr. Bryant to teach him to milk.

At school, also, he began to do better work. It would never do for Reginald to be ignorant. His teacher noticed the improvement and took special pains to help him.

All through the winter he worked hard. He tried to find things to do for the neighbors, but most of them had boys of their own, and even when he did get a chance to chop kindlings or shovel snow, he was paid but a few cents for it.

So, when spring came, all he had to show for his labor was fifty cents. It was disheartening, but the thought of Reginald Ferdinand St. Clair gave him courage.

As warm weather came on there was more to do. Now and then he had an opportunity to pick stones, or lead a horse to plow. There was also more to do at the Bryants', and he worked there conscientiously, though Mr. Bryant was very easy with him. When, on Saturday afternoon, Mr. Bryant would say, "Well, I guess you've done enough for today; you'd better go now and have a good time," it would be the signal for Jehosaphat to run to some neighbor's and work furiously till tea time, when he would return home with his earnings held tightly in his hand. Evenings he was so tired that he would fall asleep over some book that formerly would have kept him awake till late; then he would go to his room, tumble into bed and sleep soundly till morning.

As the strawberry season came on, his studies at school suffered. He stuck to them doggedly, but his outdoor work made him dull and sleepy. His teacher, not understanding the situation, took him to task for his deficiencies, and then he carried his books home and tried harder than ever to study.

Vacation began early that year, so for more than a week Jehosaphat could spend most of his time picking strawberries for Mr. Mason, who had a large fruit farm. He would get up early and do his chores at the Bryants', walk the half mile to the Masons', and be ready to go to work with the other pickers. During that time his earnings mounted up surprisingly, and his hopes were high.

After the picking was over he was very tired, and Mrs. Bryant flatly refused to call him mornings, saying that he must sleep and get rested. He made a strong effort to wake early, but when

he opened his eyes he would find the sun streaming into his room. He would dress hastily and go down, but half his work would have been done by Mr. Bryant, and he would feel that he ought to make it up in some way.

Thus two weeks went by, and he had earned nothing, so, although he hated to do it, he took a dollar from his savings and bought an alarm clock.

By the first of September, besides having the satisfaction of knowing that he had helped Mr. Bryant more than enough to pay his board, Jehosaphat had saved nearly ten dollars. And then little Ada had a birthday. Jehosaphat counted over his money, and pondered on what he should do. He wanted to give Ada a present, and yet—his name.

Somehow, in the past summer, his name had not troubled him as much as it used to. He disliked it as much as ever, but the boys had let him alone and he had heard hardly one of the objectionable epithets. Still, he was very anxious to be Reginald Ferdinand St. Clair, and it seemed very near now. He wondered how much it would cost. He wanted very much to get Ada a present.

Yes, he finally decided, he would do it, and he guessed there would be enough left for his name. So he took two dollars and a half and went to the village to get the present. He bought the little carriage and beautiful wax doll he had set his mind on, and was just starting away from the store when he saw Judge Weymouth on the other side of the street. Now was a good chance to speak to him.

"How much does it cost for a person to change his name, Judge Weymouth?" he panted.

The judge was in a hurry. "Oh, ten or fifteen dollars," he answered, and passed on without stopping.

Jehosaphat went home more cast down than he had been for a long time. School began in two days, and there would be few chances to earn. He would do well if he made up his ten dollars by spring, and then he might have to get five more. If he hadn't bought the alarm clock and the present, there would have been ten dollars. He went into the house sadly and gave Ada her present, but when he saw her delight he smiled happily, and told himself that he could wait about his name just as well as not.

The teacher hardly knew him when she came back to school. He had grown taller and larger; he now had a frank, winning expression on his sunburned face, and his gray eyes were bright and clear. He had thought over his last winter's work and had decided to do different this year. He would devote himself to his studies and not try to earn much, then during the summer vacation he could easily make up the fifteen dollars.

So he studied and read and worked hard for promotion. His farm work, after his year of training, came easy to him, every one was kind to him, and at the end of the spring vacation he was sure of the wished-for promotion.

Then, after the spring term, came the busy summer, and he worked to such purpose that by September he had twenty dollars. And one day, with his money in his pocket, he went to see Judge Weymouth.

When he came away, the money was still in his pocket, and anger and disappointment were in his heart. The judge had not been in a pleasant temper. "One name is as good as another if you only behave yourself. But if you are bound to do it—let me see; you'll have to go to the court. Who are your guardians?" sharply.

"The state."

"Ah! Have you said anything to Miss Chamberlain about it?"

"Yes, sir. She said the state couldn't—"

"Well, then," snapped the judge, "you'll have to wait till you are twenty-one," and with that he swung back to his desk, closing the interview.

For a few days Jehosaphat was moody and irritable; then he reflected that such conduct would not be becoming to Reginald Ferdinand St. Clair. So he cheered up and carried his money to Mr. Bryant and asked him what he had better do with it. Mr. Bryant advised putting it in the bank, and Jehosaphat did so.

That winter the teacher talked to Jehosaphat about sometime going to college. The more he thought of it the better he liked the idea. It would take up the time till he was twenty-one, and then he could start out with a new name and a college education.

So, summers, he worked and saved for this new object.

Before he took his final examinations he had changed his mind about the new name he was to have. He decided that Reginald Ferdinand St. Clair was not just suited to him, and he concluded that if the Bryants made no objection he would take the name of John Bryant.

The years went by, and Jehosaphat graduated from college with honors. It was the next fall that Mr. Bryant died, and Jehosaphat undertook the management of the farm and the care of Mrs. Bryant and Ada.

After he was twenty-one he had thought occasionally about changing his name, but he kept putting it off, for one reason and another, and at last almost forgot about it. He began to think it true what Judge Weymouth had said.

He began to be known as a progressive, hard working young farmer. He provided liberally for Mrs. Bryant's comfort, and gave Ada the musical education she longed for.

Then, after several years, he spoke of his early hopes and ambitions. It was to Ada he told the story.

"I had really given up all idea of changing my name," he said, at the end of the recital, "but now you have

made things different, and I think it ought to be done. It is too much to expect you to bear such a name."

"No, it isn't," she answered earnestly. "There isn't another name I'd be half so proud of."

There was a happy light in his eyes as he said: "If that is the way you feel, I will remain Jehosaphat Plunkett to the end of the chapter."—Susan Brown Robbins, in National Stockman.

Propagating Persimmons.

In our illustration we show, at "a" whip graft on native persimmon; "b" scion and "c" stock for whip graft; "d" cleft graft; "e" scion, and "f" stock for cleft graft; "g" crown budding.

The Japanese persimmon may be readily propagated from seeds, but this method cannot be used when it is desired to reproduce the characteristics of the fruit from which the seed has been taken. Hence seeds are used only for the creation of new varieties. A few seedlings of American origin equal and even surpass some varieties introduced from Japan. We illustrate the method of grafting. The cleft and splice form of grafting have been most satisfactory. A union of the stock and scion is most certain when the operation is performed in early spring before the buds have swollen to any considerable extent. In the cut "d" show the cleft form when used with a root of the American persimmon. In "f" the stock may be of any size from three-eighths of an inch to two inches in diameter. The wood should be in a healthy state.

The stock is prepared by cutting it off smoothly and squarely with a sharp saw, then with a grafting knife the stub is split to the depth of nearly two inches. The wedge, which is an essential part of most grafting knives, is inserted in the split previously made, and the two halves of the stub are separated sufficiently to admit the scion. The scion is inserted in the stock with the lower bud on the outer side of the cleft and just above the wedge portion of the stock. This side of the scion should be slightly thicker than the inner side, so the stock will hold it securely in place with the cambium layer of each part in close contact. The cambium layer is the green growing tissue lying between the bark and the wood, and it is important that this layer of the scion should come into close contact with the same tissue in the stock. When this method is



used in working stocks exposed to the air it is best to cover all wounds with grafting wax. This may be made by using by weight four parts of resin, two parts of bees-wax and one part of tallow. These materials should be broken up finely and melted together. After they are thoroughly melted, pour the liquid into a vessel of cold water. When the mixture becomes sufficiently hard it should be pulled or worked until it toughens. When grafting, it is necessary for the operator to use grease on his hands to prevent the wax from sticking to them.

The majority of Americans, since Indian wars have generally ceased, do not know what has become of the Indian question or of the surviving Indians. There has just been issued from the government printing office, at Washington, a neat and compact little pamphlet containing the statistics of the Indian tribes, agencies, and schools in the United States. As it presents the latest information on this subject from an official source, some of its figures are of interest. The total number of Indians at the agencies is 243,597. There are 64 agencies, 132 agency day schools, 10 independent day schools, 181 reservation boarding schools, 26 non-reservation schools, and 32 contract schools, and 340 Indian pupils have been placed, by way of experiment, in public schools. The largest agency is the Union Agency, in the Indian Territory, with 77,018 population, divided as follows: Cherokees, 32,161; Chickasaws, 8,730; Choctaws, 18,456; Creeks, 14,771; and Seminoles, 2,900, while the smallest is the Sac and Fox Agency, in Iowa, with 388 population. The three strongest tribes in the United States are the Cherokees, 32,161; Sioux, 21,668, and Navajos, 20,500.

American Consul Piteairn, at Hamburg, Germany, has submitted to the department of state statistics which show that in 1895 the consumption of coffee in Europe exceeded the consumption of coffee in America by nearly 15,000 tons.